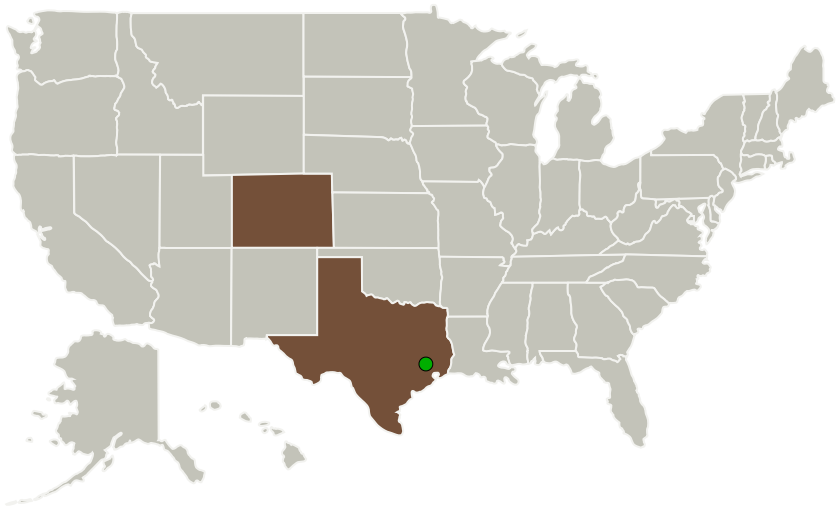
Wide Temperature Range Hybrid Energy Storage Device, Phase I

Completed Technology Project (2011 - 2011)

Project Introduction

This proposal concerns the fabrication of a hybrid battery capacitor (HBC) using Eltron's knowledge gained in battery and capacitor research. Energy storage systems are sought for use in remote robotic systems for planetary surface operations. HBCs offer improved performance while minimizing costs. Eltron has developed two different technologies that will be combined to create a hybrid device. First, modified graphite nanofibers (MGNs) with high power density have been prepared for electrochemical capacitors. Second, Eltron has developed a patented, low-cost synthesis method for preparing high surface area LiFePO4 cathode materials. Incorporation of the MGN between the LiFePO4 particles will provide an improved electrically conductive network that will advance charge transfer throughout the electrode, improving power density, cycle lifetime, and discharge capacity. We will also partner with an electrolyte manufacturer that has proven wide temperature electrolytes that perform exceptionally well at low temperatures. In Phase I composite electrode materials will be synthesized and characterized. Lab test cells will be constructed and tested using galvanostatic (charge discharge), EIS (electrochemical impedance), and wide temperature testing methods. In Phase II we will improve the performance of our HBCs and work with a manufacturer to produce prototype cells that will be delivered to NASA.

Primary U.S. Work Locations and Key Partners



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Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
Eltron Research & Development, Inc.	Lead Organization	Industry	Boulder, Colorado
Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
Colorado	Texas

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138569)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Eltron Research & Development, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

James White

Co-Investigator:

Christopher Marotta

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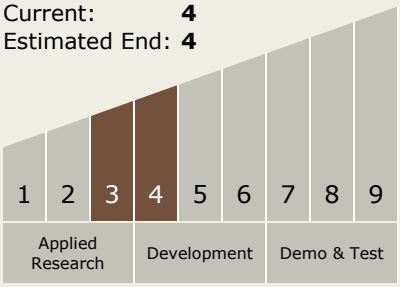
Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.2 Energy Storage
    - TX03.2.1 Electrochemical: Batteries

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System